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## A RAND NOTE

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### Accession and Attrition of Prior-Service Reservists

M. Susan Marquis, Sheila Nataraj Kirby

September 1989

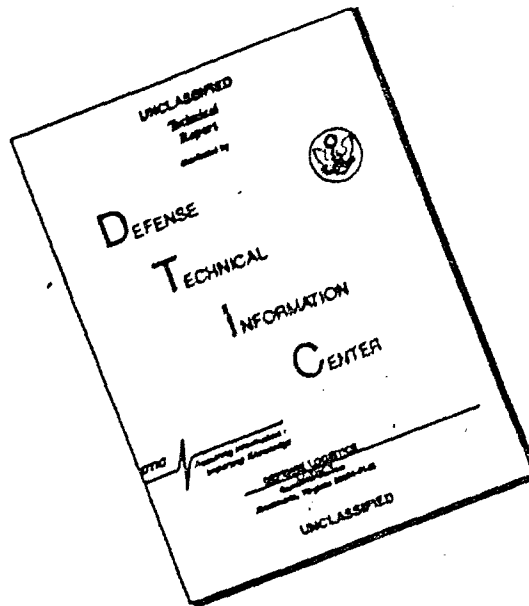
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This Note documents a briefing about research on prior-service reservists that was designed to complement previous research about the behavior of non-prior service reservists. The research investigates accession into the reserves among two groups of individuals with prior military service: (1) those who served on active duty in the Army and (2) those who served in the Army Reserve or Army National Guard and left reserve service. The research then examines the attrition decision among persons from these two groups who do join (or rejoin) the Army Reserve or Army National Guard. It considers what prior-service personnel enter the reserves, when, why, and the match between their active and reserve occupational specialties. It also considers who leaves the reserves, when, why, and how attrition patterns differ by specialty. The results suggest that targeted recruiting may have more effect on attrition rates than do changes in compensation policies. However, affiliation bonuses appear to be an effective means of recruiting those leaving active service, and, at least for the Army Reserve, in decreasing attrition among those who receive a bonus.

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N-2946-RA

Accession and Attrition of Prior-Service  
Reservists

M. Susan Marquis, Sheila Nataraj Kirby

September 1989

Prepared for  
The Assistant Secretary of Defense  
(Reserve Affairs)

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# RAND

## PREFACE

This briefing Note presents interim findings from a study analyzing the accession and attrition behavior of Army Reserve and Army National Guard enlistees who have prior military service either on active duty or in reserve service. This Note was prepared in response to a request from the Office of the Assistant Secretary of Defense (Reserve Affairs), which sponsored the analysis. The research was carried out by the Defense Manpower Research Center, part of RAND's National Defense Research Institute, an OSD-sponsored federally funded research and development center.

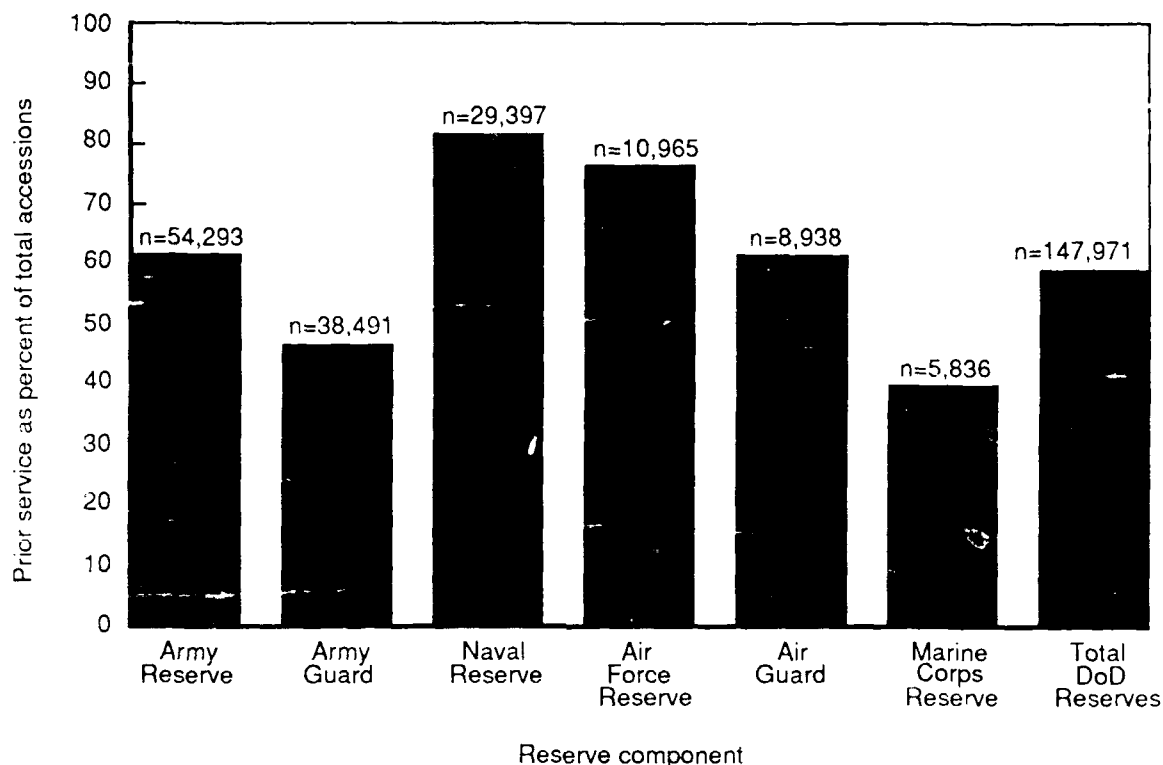
A previous report, *Economic Factors in Reserve Attrition: The Service Individuals in the Army National Guard and Army Reserve*, R-3686-RA, March 1989, gives a more comprehensive analysis of the attrition behavior of reservists in the Guard and Reserve. A second report will examine the accession behavior of individuals who leave the active Army and join the Selected Reserve, and in addition, will examine the extent of the match between the occupational speciality at entry and separation. The results reported here regarding accession behavior are preliminary.

## ACKNOWLEDGMENTS

We would first like to thank Col. David Felt, our project sponsor at Reserve Affairs, for his interest and support.

The Defense Manpower Data Center created the cohort files underlying these analyses. We thank Ginger Bassett and Joyce Hamza for constructing the analytic files and Lou Pales for helping us with the file specification. Ginger Bassett has been especially helpful in identifying and solving data problems and inconsistencies. We are grateful to RAND colleagues Lisa Hudson, Richard Buddin, and Lionel Galway for their thoughtful and constructive reviews of this Note and a previous report on attrition. We thank David Grissmer for his helpful suggestions regarding the briefing slides and for providing overall guidance of the project, and to Glenn Gotz and Susan Hosek for comments on an earlier draft. Luetta Pope and Barbara Thurston provided excellent secretarial assistance and Jeanne Heller her usual stellar editing.





Slide 1--Prior service accessions are over half of reserve accessions  
(FY86 accessions)

Reserve recruits are classified as nonprior service recruits--those without prior military training and experience--or as prior service recruits--individuals who have served in the active or reserve forces. Most previous research on recruiting and retention in the reserves has studied accession and attrition of nonprior service personnel. This Note documents a briefing about research on prior service reservists that we carried out to provide a more complete picture of the overall reserve recruiting environment. Our research investigates accession into the reserves among two groups of individuals with prior military service: (a) those who served on active duty in the Army and (b) those who served in the Army Reserve or Army National Guard and left reserve service. Our research then examines the attrition decision among persons from these two groups who do join (or rejoin) the Army Reserve or Army National Guard.

The importance of understanding prior service behavior is clear when one looks at the composition of reserve accessions. For example, in FY86, prior service personnel constituted one-half of total reserve accessions into the Selected Reserve. Between 80 and 90 percent of the Naval Reserve and well over three-quarters of the Air Force Reserve accessions are prior service individuals. Although the proportions are smaller for the Army Reserve components, they take in very large numbers of prior service personnel; these components accounted for over 60 percent of all prior service accessions in FY86. For this reason as well as the fact that the Army Reserve and the Army National Guard have traditionally had the most problems in recruiting and retention, we have chosen to focus this research on the two Selected Army Reserve components.

### **Accession**

- **Who among active and reserve force separations enters the Selected Reserve?**
- **What determines the timing of their entry?**
- **What influences their decision to join?**
- **What is the match between the occupational specialty at loss and at entry?**

#### **Slide 2--Research questions I**

Our research was designed to address a series of questions that are important for reserve manpower planning; these are shown in Slides 2 and 3. There are parallel sets of questions that need to be addressed regarding the accession and attrition behavior of prior service reservists. On the accession side, the first question examines who among active and reserve force separations enters the Selected Reserve. Second, the question of timing of entry is important because the shorter the gap in military service, the less we expect that relevant skills will have degraded. Understanding the relative importance of demographic and economic factors in the accession decision will enable planners to assess the most effective recruiting policies. The question of the match between the occupation specialty at loss and at entry is important because it has implications for personnel readiness and for training costs. For example, if a large number of prior service reservists need to be retrained upon entry, because their entry occupational specialty does not match their specialty at the time of separation, then the reduction in training costs that is frequently thought to be a concomitant of hiring prior service reservists may not actually come to pass.

### **Attrition**

- **Who among prior service reservists separates from the Selected Reserve?**
- **How soon do they separate?**
- **What influences their decision to separate?**
- **How do attrition patterns differ by specialty?**

Slide 3--Research questions II

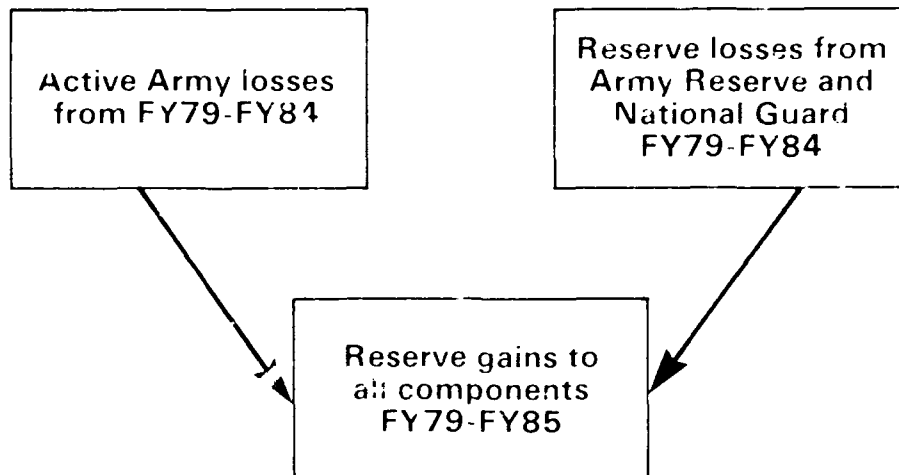
A similar set of questions needs to be addressed regarding the attrition decision. Understanding the factors that influence attrition behavior has important implications for retention policies. In addition, knowing if and how attrition differs by specialty will help determine the need for bonuses or some other form of compensation to help overcome what may be "undesirable" characteristics of particular specialties.

- Forecast the size and composition of the prior service component of the reserves
- Evaluate the effectiveness of accession and retention policies
- Identify training requirements for prior service accessions
- Examine the trade-off between prior service and nonprior service personnel

Slide 4--Policy objectives

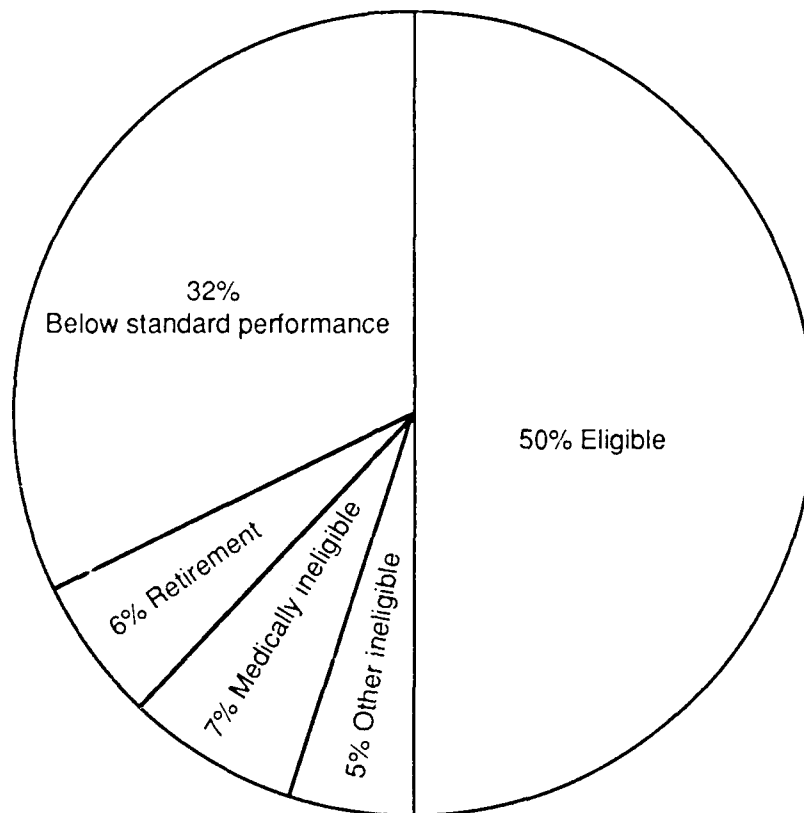
Our study can help inform policy in several areas, some of which are shown on Slide 4. Information on who comes in and how long they serve will allow us to forecast the size and composition of the prior service component of the Selected Reserve. Information on the effect of bonuses and pay on accession and attrition can help evaluate the effectiveness of such financial incentive policies. Information on the length of time since separation as well as the occupational specialty mismatch can identify the training requirements for prior service personnel. In addition to these issues, our results, along with other RAND work on nonprior service personnel,<sup>1</sup> can be used to evaluate the effective length of service from different types of personnel and to examine the trade-offs in recruiting such personnel.

<sup>1</sup>David W. Grissmer and Sheila Nataraj Kirby, *Attrition of Nonprior Service Reservists in the Army National Guard and Army Reserve*, The RAND Corporation, R-3267-RA, April 1985 and *Changing Patterns of Nonprior Service Attrition in the Army National Guard and Army Reserve*, The RAND Corporation, R-3626-RA, July 1988.



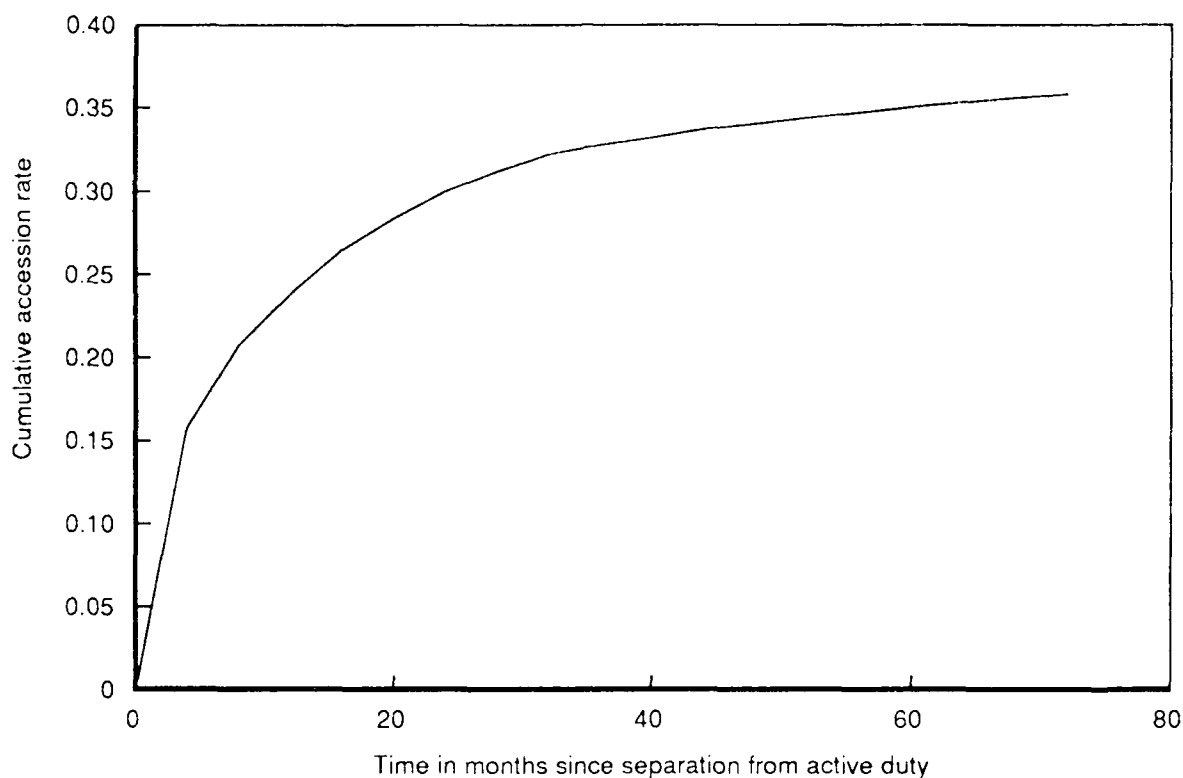
Slide 5—Data I: Prior service reserve accessions

There are two sources of prior service personnel for the reserves: losses from the active force and losses from the reserves. We obtained data on all losses from FY79-FY84 from both the active and reserve forces. These were matched, by Social Security number, to the reserve gain files for FY79-FY85. The accession files then contain a record for each loss with demographic and service data at loss and data from the gain record if any. This allows us to examine the questions of who enters, how they differ from those who do not, and the timing of entry.



Slide 6—Half of all Army active losses are ineligible to enlist in the reserves  
(FY79-85 losses)

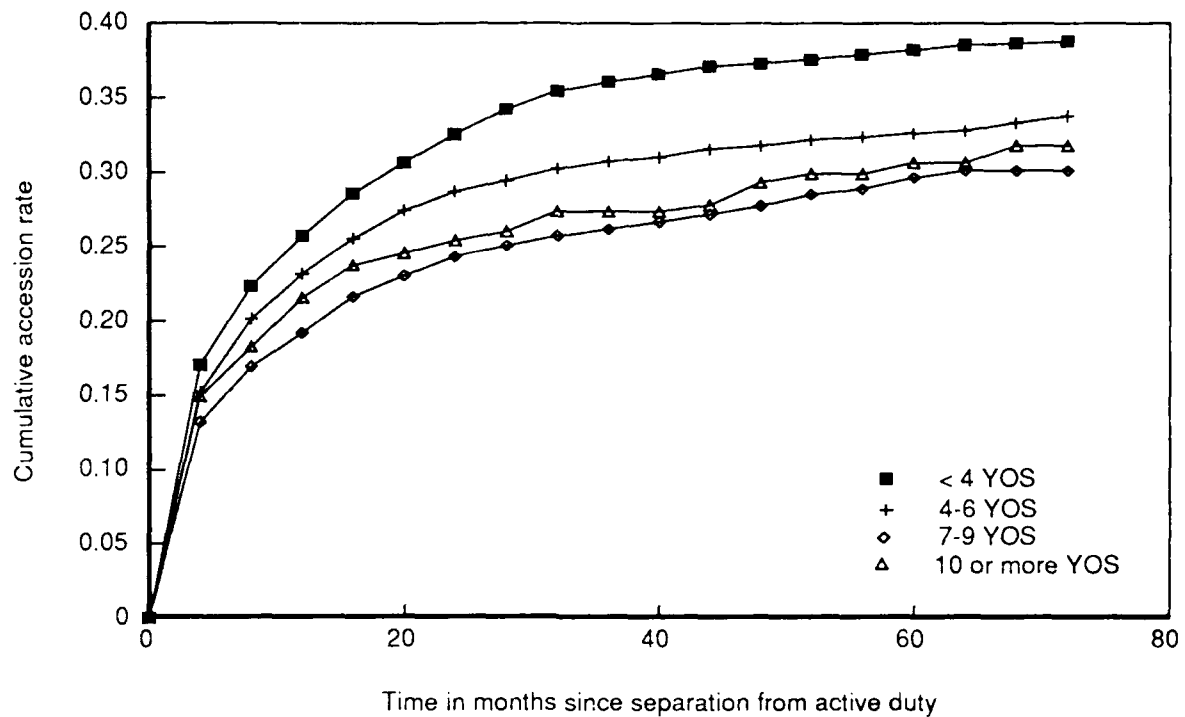
Not all losses from the active force are eligible to enter the reserves. In an attempt to sort out those who would be eligible to enter the reserves, we examined the reasons for separation. We grouped the interservice separation codes into the five broad categories shown on Slide 6. The eligible pool was defined as including those whose separation code was "Released from Active Duty;" only half of all losses fall into this category. About a third are ineligible to join the reserve because their discharge from active service was due to below standard performance. Although our definition excludes some who might be eligible to enlist in the reserves (there may, for example, be some codes that we have categorized as "other ineligible" that might allow individuals to reenlist), we felt (lacking further information) that this was a plausible and defensible definition of the eligible pool. Indeed, a later check of those who did enlist in the reserves revealed that approximately 95 percent were drawn from our pool of eligibles.



Slide 7--Over one-third of active Army losses join the reserves  
(FY79-84 loss cohorts)

We now examine entry into the reserves among active Army losses designated as eligible. Slide 7 shows reserve accession rates over time, controlling for time since separation. The x-axis displays time in months since separation; the data points for the later months are, of course, derived from the early cohorts included in our study. The y-axis measures the cumulative proportion of eligibles entering the reserves. We find that over a third of all losses from the active Army eventually join the reserves. However, as the slide makes clear, most of those joining do so within the first year; almost two-thirds of all those who eventually enlist in the reserves do so within the first year of separation from the active force.



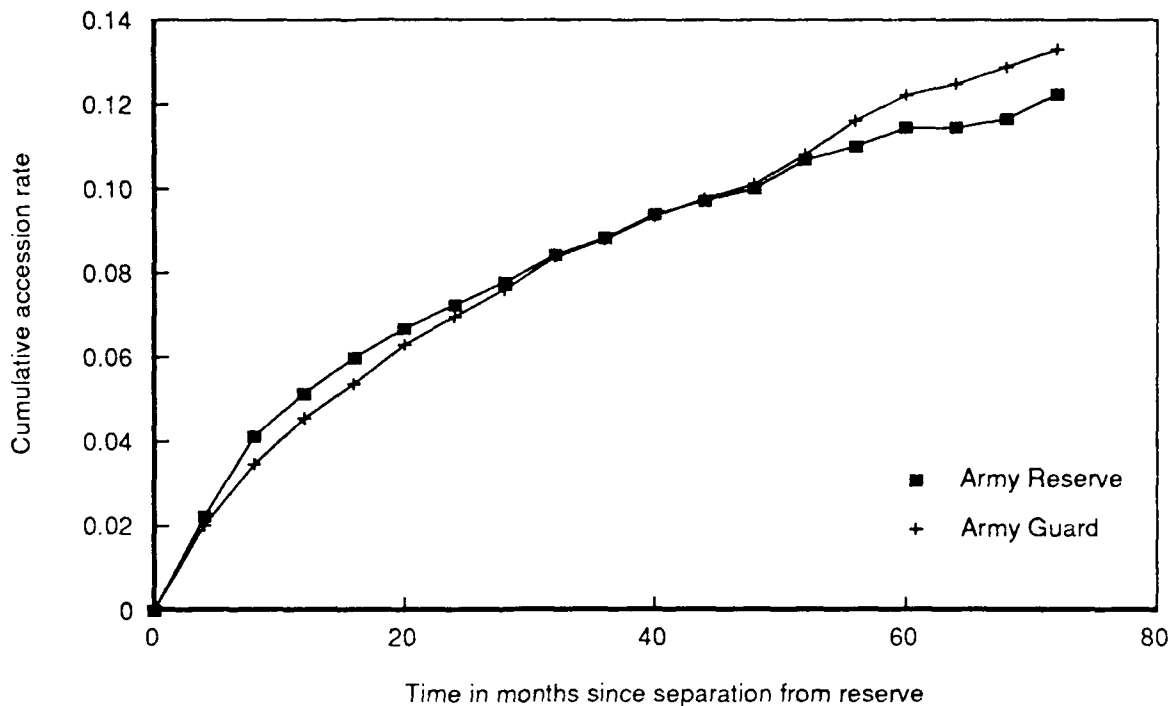


Slide 8--Accession decreases as years of active service increase  
(FY79-84 loss cohorts)

We hypothesized that individuals with more years of service would be more likely to enlist in the reserves than those with fewer years for three major reasons. First, those with longer service are at high pay grades and so command a high level of reserve compensation. Second, they have a greater investment in the military retirement system. Third, individuals with more service experience are likely to be those with a higher taste for the military.

However, as Slide 8 shows, we find that individuals with six or fewer years of service appear to have higher accession rates than those with more than six years of service. There are several possible explanations for this finding. One, those with greater years of experience may face demand constraints. There are limited opportunities at the high pay grades and the reserves prefer to promote from within. Hence, those leaving active service at the high grades may have

difficulty finding an opening even if they wish to join a reserve unit. A second explanation revolves around the fact that affiliation bonuses were offered during part of the study period to those who joined a reserve unit immediately upon separation from active duty. The bonus, however, was available only to those with a remaining military statutory obligation--only to those who had served on active duty for a shorter period of time and consequently still had time to serve. The bonus, therefore, might account for the greater propensity to join the reserves among individuals with six or fewer years of active duty service. A third reason may have to do with the differences among those leaving active service at the end of the first term versus the second term or later. If the latter differ in, say, their taste for the military, then we might see differences in their rates of accession into the reserves. Again, there may be unmeasured characteristics associated with being older that may cause this result.

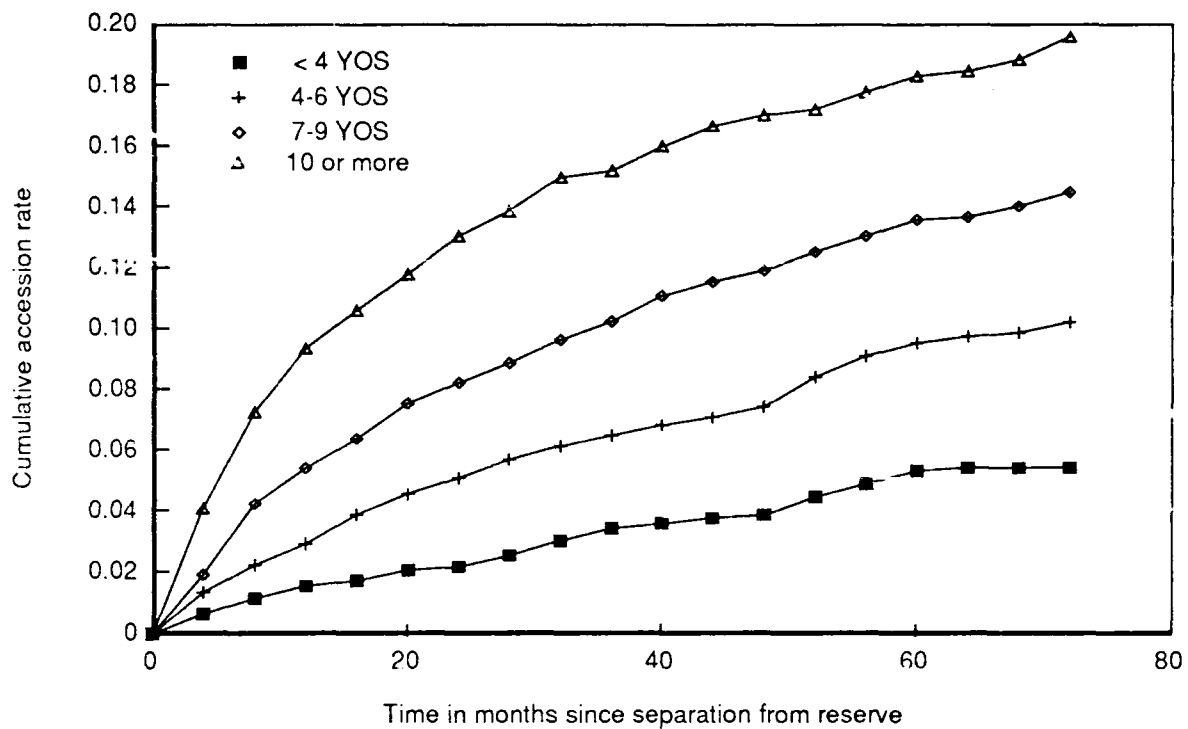


Slide 9--Accession from reserve losses is lower than from active losses  
(FY79-84 reserve loss cohorts)

Turning to losses from the reserve forces who subsequently reentered the reserves, we find that the accession rates are lower than those for individuals leaving the active Army<sup>1</sup>. Indeed, only about 13 percent of those lost from the reserves during FY80-FY84 (as compared to 35 percent of the active Army losses) had rejoined the reserves over this six-year period. However, unlike the active Army losses, the accession rate appears not to tail off but to continue to increase over

<sup>1</sup>In this analysis, we excluded retirees (defined as those with 30 or more years of service at the time of loss). However, the eligible base includes all other losses, i.e., we have not excluded individuals discharged for reasons of medical ineligibility or below standard performance. Separation codes were not present for losses from the National Guard and were available for less than 30 percent of losses from the Army Reserve. If we had excluded Army Reserve losses with a separation code that indicated ineligibility, our accession rate would increase by fewer than two percentage points.

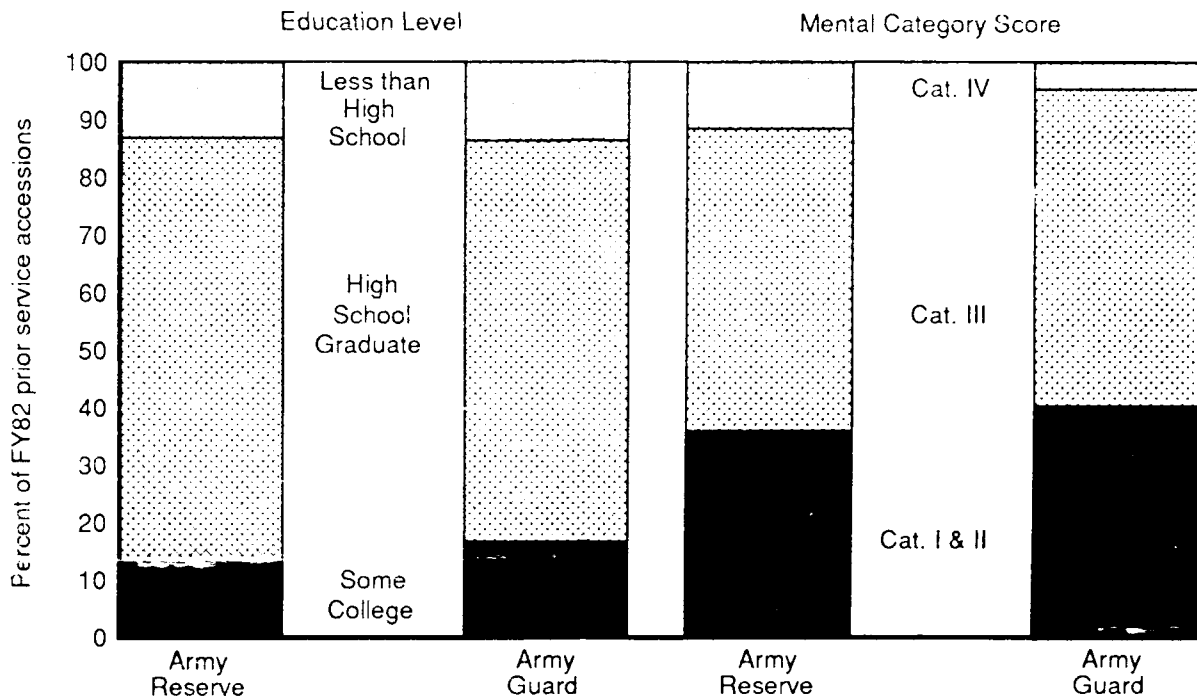
time, so with a longer time horizon we might find a higher cumulative rate among reserve losses. The finding also means that the gap in service is typically longer for a prior reservist who rejoins the reserves than for a prior active military individual.



Slide 10--Accession among prior service reservists increases with length of service  
(FY79-84 reserve loss cohorts)

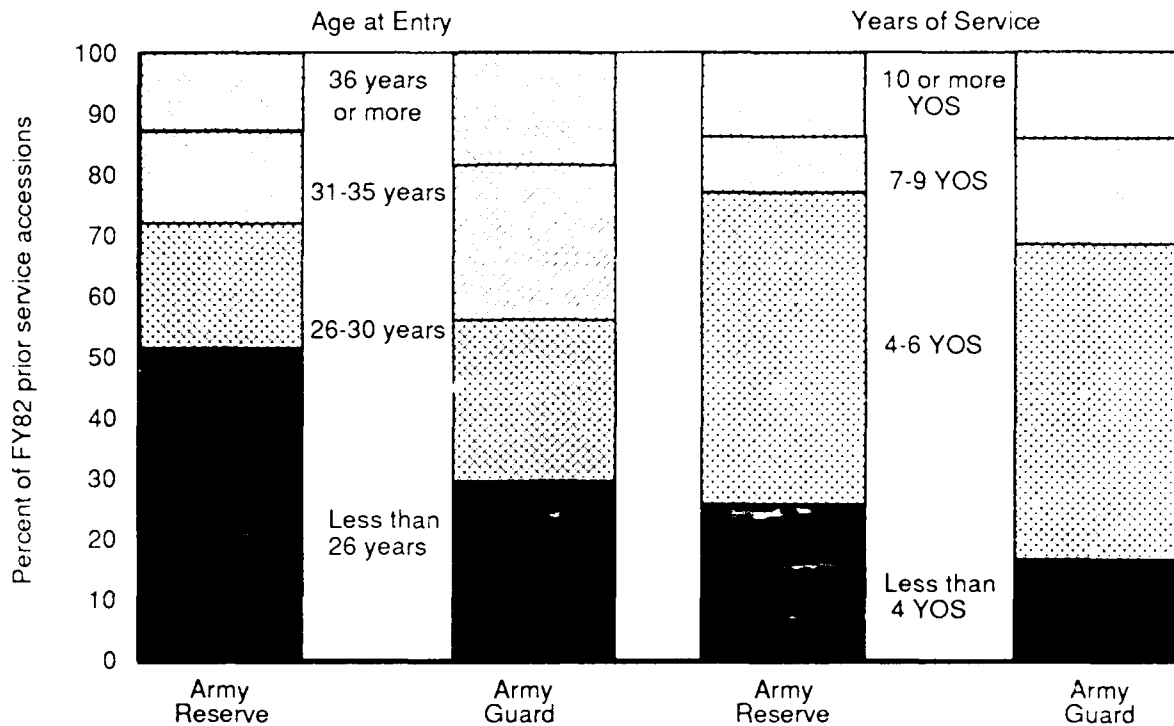
When we examine the accession rate of reserve losses among reservists with different amounts of prior military service, we find the expected result. Here, persons with more years of service are more likely to rejoin the reserves than those with fewer years of service. The highest rates of reentry are among those with 10 or more years of service. We hypothesize that demand constraints among those with more years of service are less important for individuals with prior reserve service than for those coming straight from the active force since the former are more familiar with reserve service and reserve units. In addition, the affiliation bonus that might explain the high propensity to join the reserves among active losses with fewer years of service was

not offered to prior reserve service personnel. Yet a third reason may be that younger individuals leaving the reserves may separate for very different reasons than older individuals and these reasons may cause them to be less likely to rejoin.



Slide 11--The Army Reserve and Army National Guard attract high quality prior service personnel

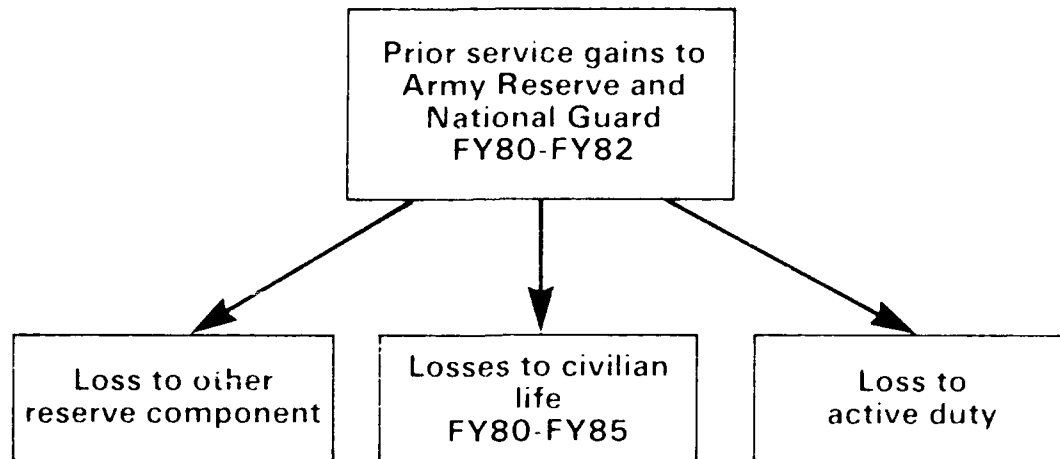
Let's take a look at a typical accession cohort, consisting of both prior reserve and prior active personnel, who joined in FY82. Both the Army Reserve and Army Guard attract high quality prior service personnel when one considers the education level and the AFQT (Armed Forces Qualifying Test) scores. About 85 percent are high school graduates and between 85 to 94 percent are ranked in one of the top three categories (Cat I, II, III) of the AFQT (have scores of 31 or better on a 100 point scale).



Slide 12--The Army National Guard takes in older, more experienced personnel than the Army Reserve

When we look at the age and prior years of service we see that the Guard has older and more experienced entrants. About 45 percent of Guard accessions are over 30, as compared to a quarter in the Army Reserve. Similarly, 30 percent of Guard accessions have six or more years of service; the corresponding number for the Reserve is 20 percent. Obviously, the two characteristics are related.

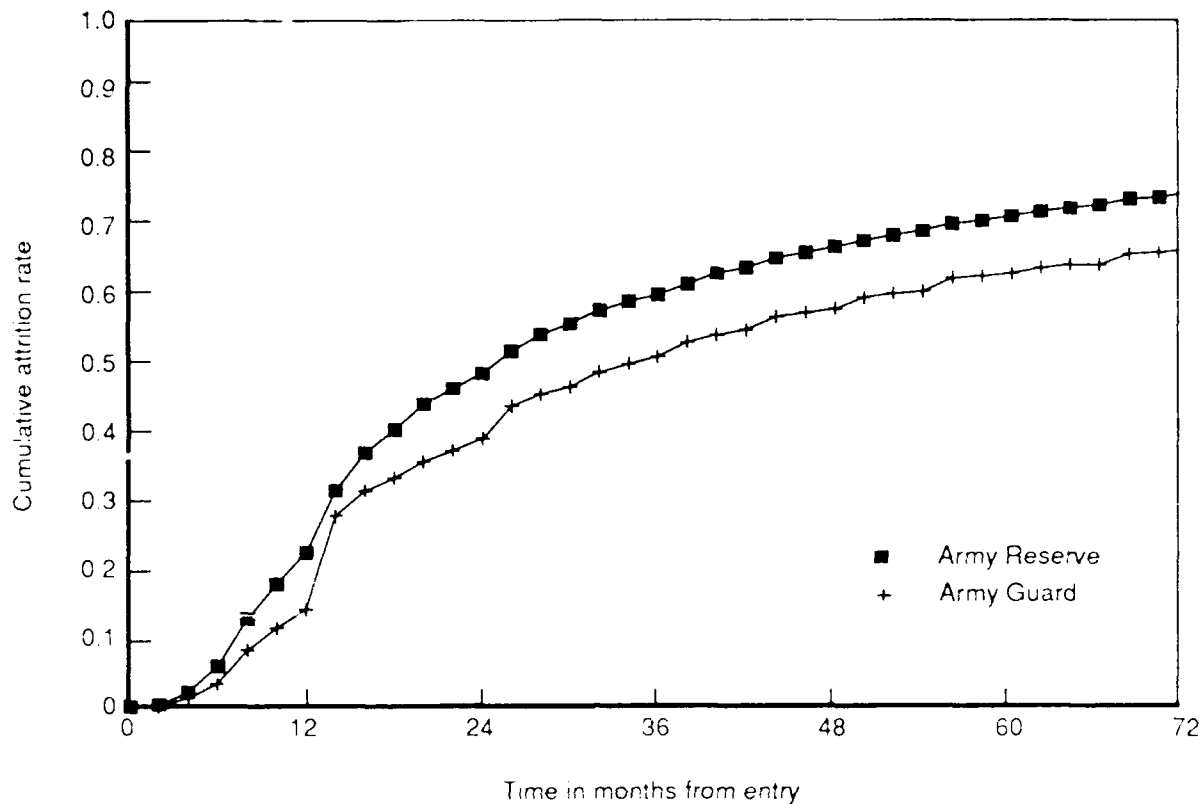




Slide 13--Data II: Prior service reserve attrition

Our analysis of attrition uses data on entry cohorts FY80-FY82. These cohorts were followed through FY85 to determine their loss behavior. That is, for any individual entering in a given fiscal year, we follow them forward to look at their attrition behavior.

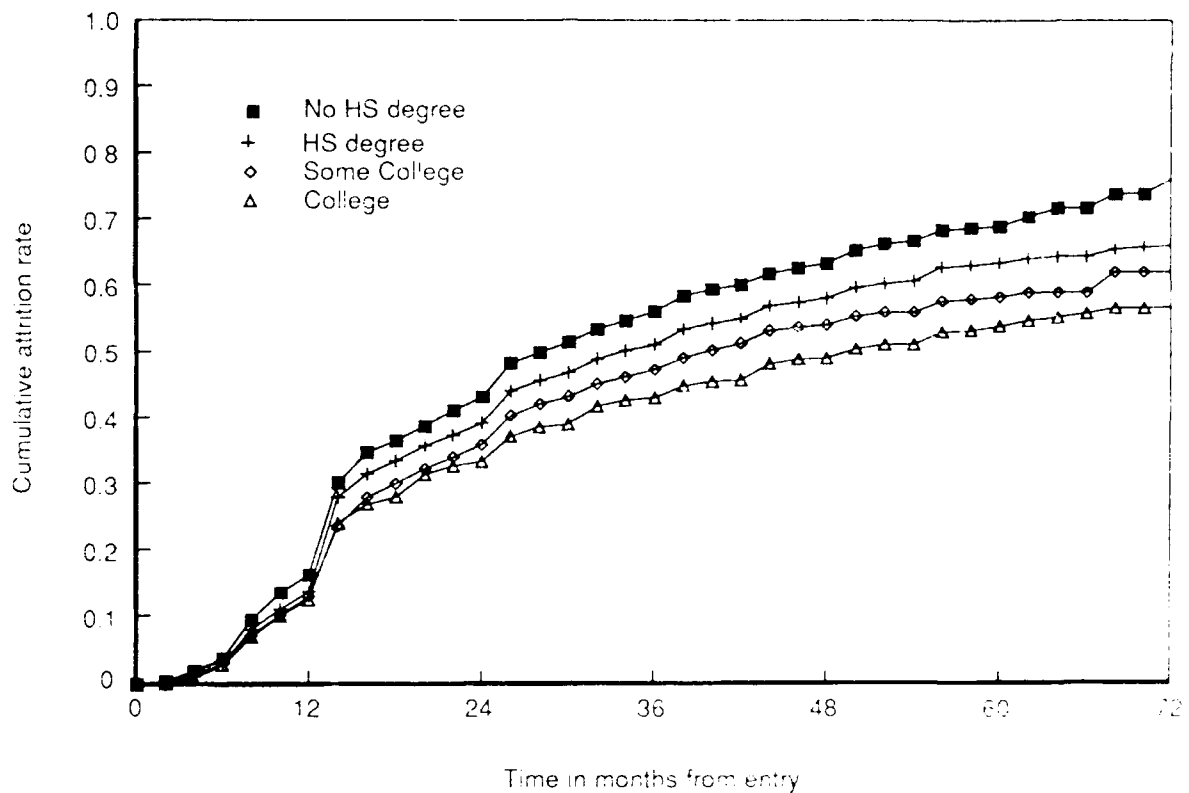
We need to define what we mean by attrition. Depending on the point of view adopted by the policymaker, attrition can be defined as all losses to the unit. However, some of these losses are really transfers to another component or to the active force. From the total force perspective, such "losses" are not really losses because some of the training investment is recouped, although they are losses to the component. In this study, we adopt the total force perspective and look at losses to civilian life. Therefore, only losses to civilian life constitute attrition in our analysis.



Slide 14--Almost half of prior service accessions separate within two years  
(FY80-82 prior service accession cohorts)

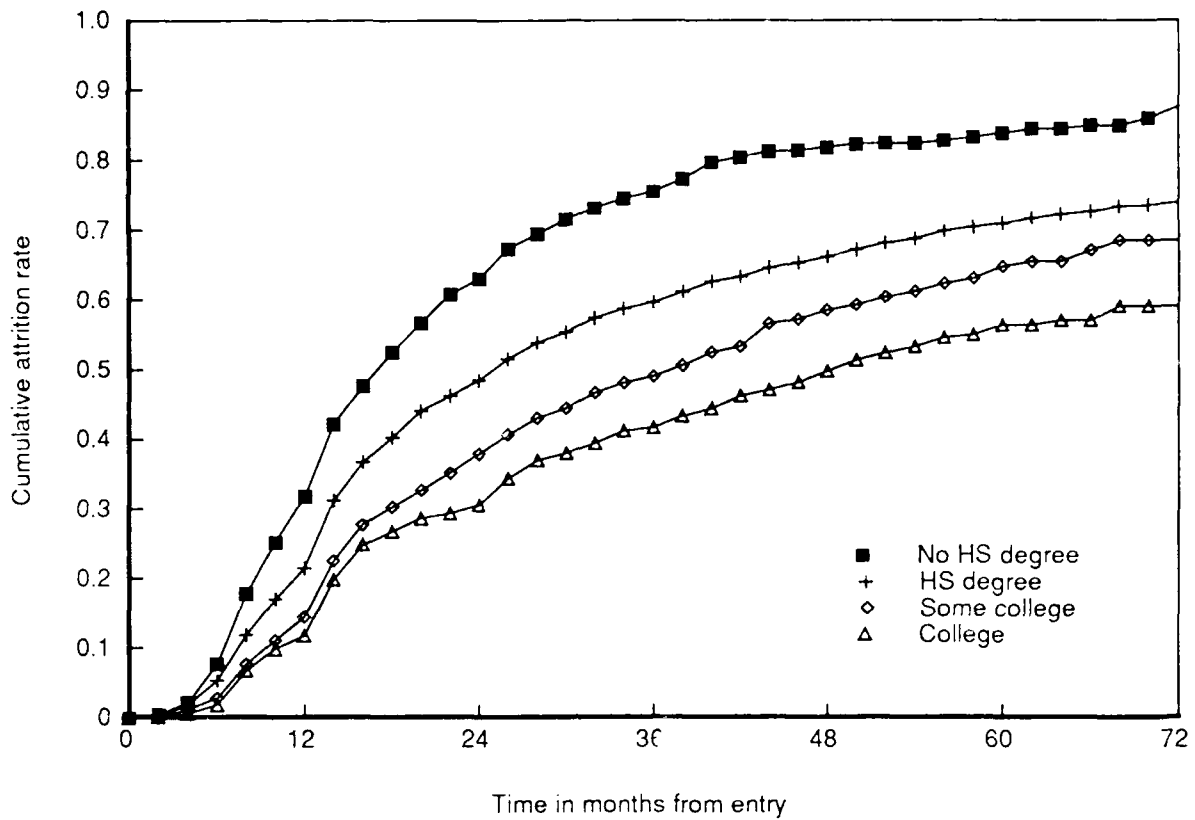
Slide 14 presents data on the attrition rate of the FY80-FY82 cohorts. We find that almost half of prior service accessions separate within two years. There is a definite rise at 12 months, because most prior service personnel enlist for one year. The Army Reserve appears to have higher attrition than the Guard, in other work done at RAND, we find that this is true for nonprior service personnel as well.<sup>1</sup>

<sup>1</sup>Grissmer and Kirby, 1985 and 1988.



Slide 15--Higher education leads to lower attrition in the Army National Guard  
(FY80-82 prior service accession cohorts)

Slides 15-18 show how attrition rates vary by characteristics of individuals in the Army Reserve and Army National Guard. First, we find large differences in attrition rates of groups with varying levels of education. Those with less than a high school education have the highest attrition rates. For example, about 45 percent of guardsmen who have not completed high school drop out within the first two years, as compared to 30 percent of those with a college education.



Slide 16--Effects of education are greater in the Army Reserve  
(FY80-82 prior service accession cohorts)

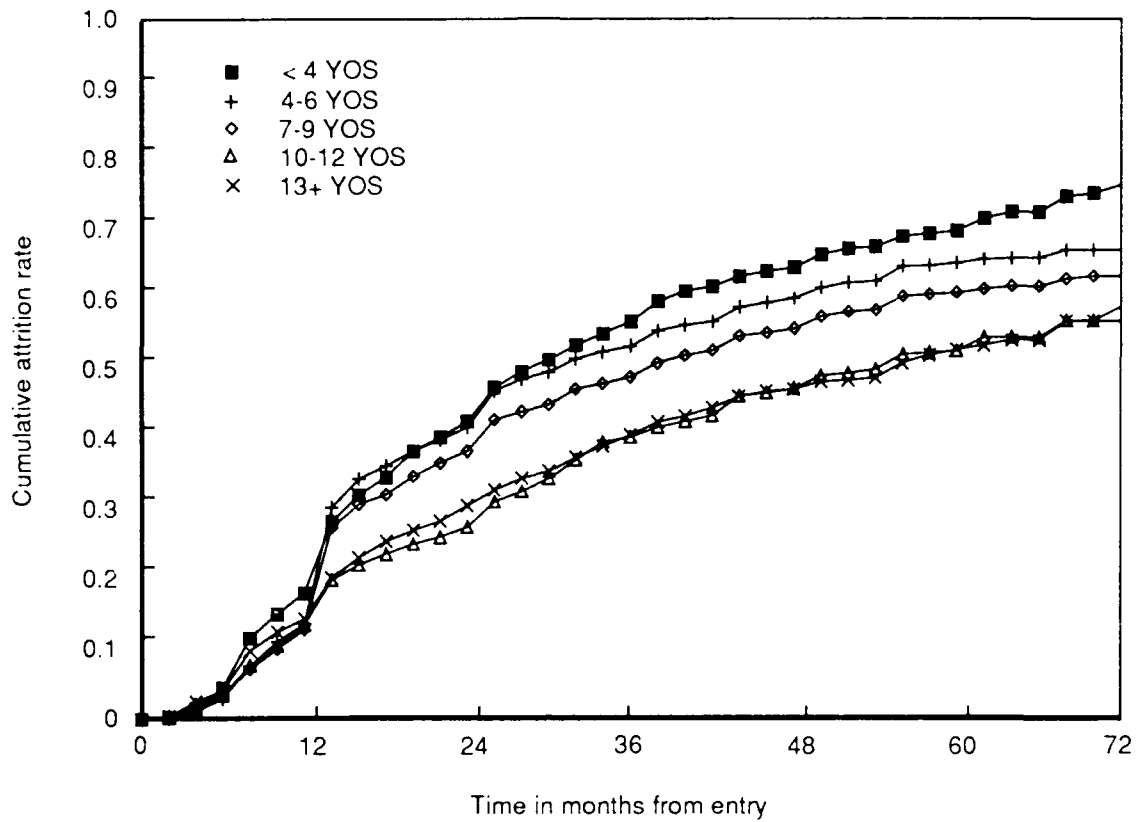
In the Army Reserve, the differences in attrition rates among groups with varying levels of educational attainment are even more pronounced. Here the two-year rate of attrition for those who have not completed high school is over 60 percent, whereas the attrition rate falls by half for those who have completed college. These effects mirror what other research has found for nonprior service individuals.<sup>1</sup>

We can use the curves shown in these slides to estimate how many months of service we expect a typical recruit, and recruits in different subgroups, to serve.<sup>2</sup> For the Guard, the curve in Slide 14 suggests that a typical recruit can be expected to serve 39 months over the six-

<sup>1</sup>Grissmer and Kirby, 1985 and 1988.

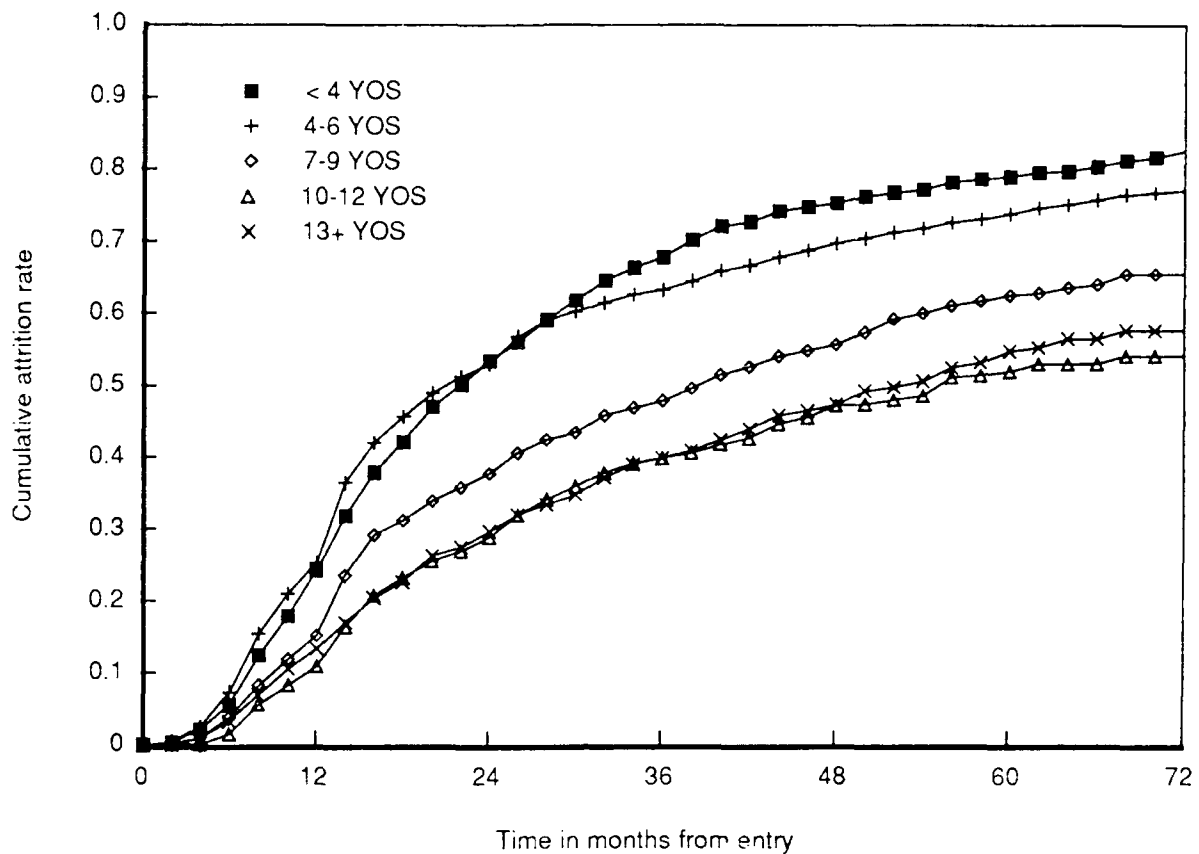
<sup>2</sup>If there was no attrition, we would have 72 months of service per recruit over six years. The area under the attrition curve gives us the expected reduction in months of service due to attrition, so expected service is 72 months less the area under the curve.

year period covered by our analysis. If we make the calculation for a guardsman without a high school degree compared to one with a college education, we find that we can expect eight months more of service from the more highly educated recruit than from the recruit who has not completed college. For the Army Reserve, the typical recruit can be expected to serve about 34 months. But we also can expect 18 months more of service from someone with a college education than from someone without a high school degree.



Slide 17--Attrition decreases with prior experience in the Army National Guard  
(FY80-82 prior service accession cohorts)

Slides 17 and 18 show that attrition rates decline with the number of years of prior military service the recruit has at entry to the reserves. Here, we show that the two-year attrition rate for those with less than four years of service is 40 percent in the Guard as compared to 30 percent for those with 10 or more years of service. In terms of length of service during a six-year period, we expect about seven more months from those with 10 or more years of service than from those with fewer than four.



Slide 18--Prior experience also lowers attrition in the Army Reserve  
(FY80-82 prior service accession cohorts)

Again, the differences in attrition rates are much larger in the Army Reserve than in the National Guard (a two-year attrition rate of 50 percent for those with fewer than four years of service compared to 30 percent for those with 10 or more years of service), and suggest that the Army Reserve can expect 15 more months of service over the first six-year period from someone who has 10 or more years of service than from a recruit with fewer than four years of service.

**Attrition decreases as:**

- **Military pay increases**
- **Special incentive bonuses are offered**
- **Civilian pay falls**
- **Unemployment increases**
- **Job, geographic, and family stability increase (education, age proxies)**

Slide 19--Multivariate analysis hypotheses

What we have shown thus far are bivariate relationships, showing the total effect of a characteristic and everything that correlates with that characteristic on attrition. For example, those who have served longer in the military are likely to be at higher pay grades and to have more invested in the military retirement system, so the effects of years of service shown Slide 18 may reflect the effects of compensation on attrition. But those with more years of service also tend to be older, and older individuals are at a more stable life-stage, making continued reserve service easier. We need to determine which explanation is more important because the two have different implications for manpower planning. To estimate the "net" effect of a variable, i.e., its effect holding other factors constant, we need to carry out multivariate analyses.

We expect that several factors may alter an individual's valuation of reserve service relative to civilian alternatives and lead to a decision to separate. Among these are:

- Changes in the relative rewards from military and civilian life;

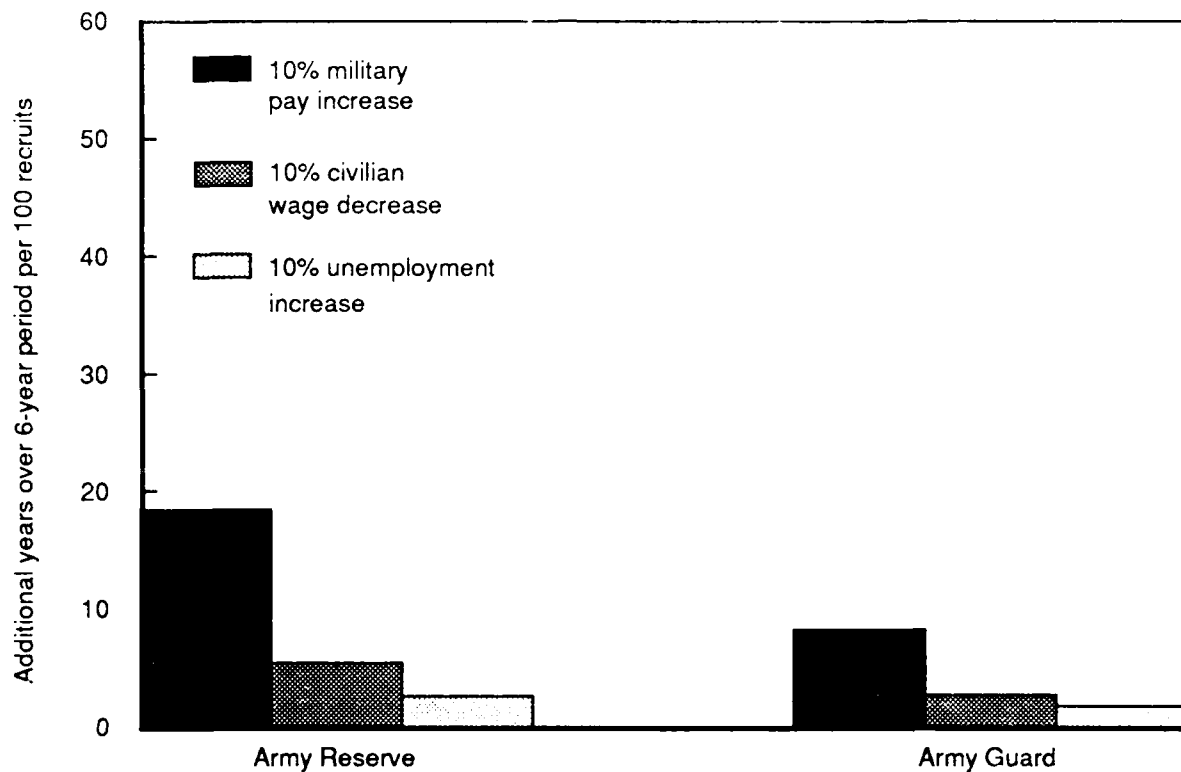


- Changes involving major external circumstances of the individual's life such as marital status and geographical location.

This theoretical framework leads to the testable hypotheses shown in Slide 19. First, we hypothesize that, other things equal, increases in military pay will raise the expected return from military service relative to civilian alternatives or to leisure time, thus decreasing the attrition rate among reservists. Second, in addition to basic military pay, special bonuses may be offered that are targeted specifically to attracting and retaining reserve personnel with critical skills or in designated priority units in the Selected Reserve. These bonuses raise the immediate return from reserve service; in addition, they are frequently paid in installments and we hypothesize that the withheld payments will provide an incentive for continued reserve service. Third, analogous to the increases in military pay raising the value of reserve service relative to civilian alternatives, decreases in civilian pay will also raise the attractiveness of reserve service relative to civilian options. Fourth, changes in the unemployment rate reflect changes in civilian opportunities; as unemployment increases, the more difficult it will be to find an alternative in the civilian sector and the more likely an individual will be to opt for continued reserve service. Finally, those characteristics of an individual that are likely to be related to job, family, or geographic stability are also likely to be related to lower attrition. For example, older individuals are generally more stable in terms of civilian jobs and family responsibilities than their younger counterparts and, as such, should have lower attrition. Similarly, individuals with higher education are likely to have higher job stability than those with lower levels of educational attainment; this again should lead to lower attrition among the former<sup>1</sup>.

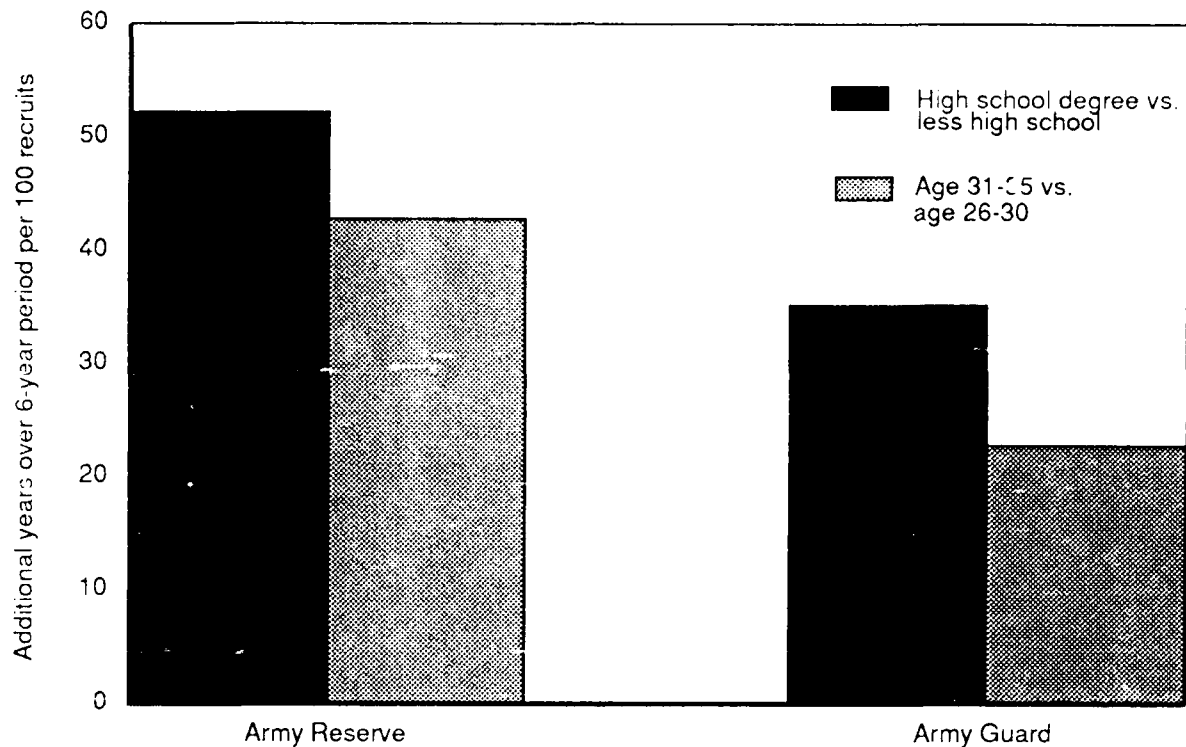
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<sup>1</sup>See Grissmer and Kirby, 1985 and 1988, for a more detailed exposition of these arguments.



Slide 20--Economic factors do affect attrition

Slide 20 shows the results from our multivariate analysis on the effect of economic factors. We display the increase in expected years of service over a six-year period per 100 recruits given a 10 percent change in the economic variable. To place these numbers in context, we expect 284 years of service per 100 Army Reserve recruits and 325 years of service per 100 National Guard recruits over this six year period. A 10 percent increase in military pay increases the expected years of service by almost 20 years in the Army Reserve (a 7 percent increase) and about 10 years in the National Guard (a 3 percent increase). The effects of the other economic factors are smaller.



Slide 21--But demographic characteristics have much larger effects

Recruiting individuals with higher educational attainment or recruiting older individuals has a much bigger effect than changing compensation. Recruiting 100 prior service individuals with a high school degree into the Army Reserve increases the expected years of service by more than 50 over a six-year period, as compared with 100 recruits who have not completed high school (an 18 percent increase); 100 recruits age 31-35 can be expected to provide about 40 more years of service than 100 recruits age 26-30. The effects in the National Guard, although somewhat smaller, are also substantial. Those with a high school degree provide 13 percent more years of service than those who have not yet completed high school, whereas older individuals provide 9 percent more years of service than younger individuals.

	Effect on Attrition	
	Army Reserve	National Guard
Affiliation Bonus	Decrease	No Effect
Reenlistment Bonus		
Eligible at Reenlistment	No Effect	No Effect
Received Bonus	Decrease	No Effect

Slide 22--Effect of bonuses on attrition is inconclusive

Slide 22 summarizes our findings concerning the effect of special bonuses. Two kinds of bonuses were offered during the time period covered by our study. The first was an affiliation bonus, offered to individuals joining the reserves who were serving or had served on active duty and who had a remaining military obligation. Affiliation bonuses for prior active duty personnel may affect attrition because only half of the bonus was paid at enlistment and half was withheld until the fifth anniversary of enlistment into the military. We hypothesized that the withheld portion would be an inducement to continued service; this effect was found in the Army Reserve but not in the National Guard.

The reenlistment bonus might also influence attrition decisions among those who do accept the bonus. Reenlistment bonuses were offered to those with fewer than 10 years of service in designated units or specialties. We hypothesized that individuals in these units or specialties would be less likely to separate earlier because they would anticipate that they could receive a bonus if they reenlisted at the next opportunity. We did not find this effect.

Like affiliation bonuses, reenlistment bonuses were paid in installments. So we also expected that the installment part of the bonus would encourage continued service among those who actually received a reenlistment bonus. Again, we did find this effect in the Army Reserve but not in the National Guard.

It is, however, difficult with the data at hand to obtain unbiased estimates of the bonus effect. Bonuses are typically targeted for skills or geographic areas in which the reserves have difficulty recruiting and retaining personnel. Therefore, it is likely that individuals in these skills and areas differ from other reservists in their civilian opportunities. If we have not measured and controlled for these differences, our estimates of the bonus effect will be biased. Similarly, the effect of the affiliation bonus is estimated by comparing accession decisions by those in cohorts not offered the bonus with later cohorts. Changes in recruiting efforts or economic conditions over time might be confounded with the offer of the bonus and bias our result.

### **Trade-off among prior and nonprior service personnel**

- **Time to return is shorter for active losses than for reserve losses**
- **Prior experience increases accession among reserve losses, decreases accession among active losses**
- **Attrition among prior service personnel is as high as among nonprior service personnel**

### Slide 23--Conclusions I

We conclude by summarizing how our findings relate to some of the policy issues we raised earlier.

Because the time between leaving military service and returning to the reserves is shorter from active losses than for reserve losses, the on-the-job training need and retraining needs, and hence the associated costs, can be expected to be lower for the former group, assuming they work in same skills.

The seniority of prior service personnel has implications for budgetary costs for basic pay and retirement outlays. We find that among prior service personnel, active losses with short terms of prior experience are most likely to affiliate. This finding is reassuring given that the present experience-mix of the reserve force finds unusually large cohorts in the 10-20 year of service groups and that current 15-year projections show strong increases in the number of reservists with greater than 15 years of service. There is a real need to keep enlistment and retention rates high among the more junior force personnel.

Based on a comparison with other RAND research, attrition among prior service personnel is as high as among nonprior service personnel. In terms of length of service, then, there are no expected gains from recruiting an individual with previous military service.

### **Assessing accession and retention policies**

- **Characteristics of recruit affect retention more than compensation level**
- **Affiliation bonus may be effective in recruiting from active losses**
- **But difficult to disentangle effects of compensation policies absent experiments**

#### **Slide 24--Conclusions II**

Our results suggest that targeted recruiting may have more effect on attrition rates than do changes in compensation policies. We have shown that while economic factors do have small and significant effects on attrition, these effects are overshadowed by the much larger effects of demographic characteristics on attrition. However, affiliation bonuses appear to be an effective means of recruiting active losses, and, at least for the Army Reserve, in decreasing attrition among those who receive a bonus. However, it is difficult to accurately estimate the effects of changes in bonuses and other forms of compensation without controlled experiments.